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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/009,127	04/29/2002	Kari Pajukoski	4925-176PUS	5550

7590 10/17/2006

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EXAMINER	
AHN, SAM K	
ART UNIT	**PAPER NUMBER**
2611	

DATE MAILED: 10/17/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/009,127	PAJUKOSKI ET AL.	
	Examiner	Art Unit	
	Sam K. Ahn	2611	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *10 July 2006*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-3,5-12,14-20,22-31,33-41,43,44,46-50 and 52-55* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☒ Claim(s) *6-8,26,28,29 and 34-36* is/are allowed.

6)☒ Claim(s) *1-3,5,9-12,17-20,22-25,27,30,31,33,37-39,43,44,49,50 and 55* is/are rejected.

7)☒ Claim(s) *14-16,40,41,46-48 and 52-54* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *29 April 2002* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Response to Arguments

1. Applicant's arguments, see p.14, filed 07/10/06, with respect to the rejection(s) of claim(s) 4,21 and 32 under 103 have been fully considered and are persuasive. Therefore, the rejection has been withdrawn. However, upon further consideration, a new ground(s) of rejection is made in view of Mueller and Kim, as explained below.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. Claims 1,2,9,10,12,17-21,30,32,37-39,43,44,49,50 and 55 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ling et al., USP 6,377,607 B1 (Ling, cited previously) in view of Mueller et al. US 5,379,324 (Mueller) and Kim et al. US 6,067,333 (Kim) and in further view of Narvinger et al, USP 6,381,229 B1 (Narvinger, cited previously).

   Regarding claim 1, Ling teaches a method for performing an interference estimation in a spread spectrum system comprising:

   receiving (receiver with an antenna and a demodulator receiving signals, 42,44 in Fig.2) a spread spectrum signal (signal spreaded with Walsh codes, note col.7,

lines 20-26, thus forming the spread spectrum signal), and further teaches calculating interference from the received signal by integrating (performing summation, 128 in Fig.6) despread sample signal (output of the PN despreader122 in Fig.6) over a spreading code length (N of 64, number of chips per pilot burst, note col.12, line 49) of said received spread spectrum signal (via despreader 122); integrating (summation in 126) a signal corresponding to a power of said despread sample signal (provided by PN despreader 122); and subtracting (subtracting element 132) a signal obtained by squaring (138 squarer) an output signal of said integration of said despread sample signal (output of 128) from an output signal of said integration of the signal corresponding to the power of said despread signal (output of 126). And Ling further discloses that the output of the subtracting element 132 is an interference estimation the received signal (N*t, l*, note col.13, lines 48-51).

Ling further teaches determination of interference in the received signal, and also teaches integrating and subtracting steps, as explained above, wherein the output of 126 and 128 via 134 provides total received signal and transmitted desired signal (note col.12, lines 38-45 and col.13, lines 43-47). However, Ling does not explicitly teach calculating a variance estimate by the integrating and subtracting steps.

Mueller teaches calculating a variance estimate by received signal r(k) and transmitted desired signal x(k) using the equation in column 10, line 35, further note col.9, line 64-67 and col.10, line 5. Hence both Ling and Mueller teach

computation of the transmitted desired signal and received signal. Ling also teaches computation of a variance while Mueller also teaches estimation of a variance and that through the determination of the variance of Mueller, a channel gain characteristic of the communication channel is calculated (note col.5, lines 64-68). Therefore, it would have been obvious to one skilled in the art at the time of the invention to incorporate the teaching of Mueller in the system of Ling by using the output of 126 and 128 via 134 provides total received signal and transmitted desired signal in the equation in column 10, line 35 of Mueller for the purpose of computing a variance for the purpose of calculating a channel gain characteristic of the communication channel, as taught by Mueller (note col.5, lines 64-68).

However, Ling in view of Muller do not explicitly teach wherein the generating step of the despread sample signal is performed by averaging over a predetermined code period.

Kim teaches a CDMA system of receiving a spread spectrum signal (signal spreaded by PN received by 201 in Fig.2) and generating a despread sample signal (signals of 209,210) by averaging over a predetermined code period (averaging for Np chip periods, note col.3, line 64 – col.4, line 10). Both Ling and Kim teach a CDMA system receiving spread spectrum signals and generating a despread sample signal wherein Kim further teaches that averaging over the predetermined code period provides proper channel parameter evaluation values (note col.3, lines 64-67), hence provides proper values for further evaluation of

the signals. Therefore, it would have been obvious to one skilled in the art at the time of the invention to incorporate the teaching of Kim in the despreader of Ling by generating the despread sample signal (122) by averaging over a predetermined code period for the purpose of providing proper channel parameter evaluation values, as taught by Kim (note col.3, lines 64-67). As a result, the values of 122 received by the summation circuit (126 and 128) would further evaluate based on the despread sample signal.

However, Ling in view of Muller and Kim do not explicitly teach the spread spectrum system using a plurality of spreading codes with different code lengths. Narvinger teaches a spread spectrum system implementation of different spreading factors to support variable transmission rates (note col.9, lines 19-27). Therefore, it would have been obvious to one skilled in the art at the time of the invention to transmit signals in the spread spectrum system of Ling implementing different spreading factor for the purpose of supporting a desired or required transmission rates, as taught by Narvinger. Thus, by implementing as such, the system would average over a predetermined code period (note col.8, lines 14-15).

Regarding claim 2, Ling further teaches wherein said variance estimate is calculated by averaging said despread sample signal over a spreading code length of said received spread spectrum signal (note col.12, lines 36-52 wherein

the computation of the variance estimate of the total received signal is averaged over N, wherein N is the number of chips per pilot burst).

Regarding claim 9, Narvinger further teaches wherein said spread spectrum system is a WCDMA system (note col.1, line 30).

Regarding claim 10, the claim is rejected as applied to claim 1 with similar scope. The further limitation of sampling means is taught by Kim teaching a CDMA system of receiving a spread spectrum signal (signal spreaded by PN received by 201 in Fig.2) and generating a despread sample signal (signals of 209,210) by averaging over a predetermined code period (averaging for Np chip periods, note col.3, line 64 – col.4, line 10). Both Ling and Kim teach a CDMA system receiving spread spectrum signals and generating a despread sample signal wherein Kim further teaches that averaging over the predetermined code period provides proper channel parameter evaluation values (note col.3, lines 64-67), hence provides proper values for further evaluation of the signals. Therefore, it would have been obvious to one skilled in the art at the time of the invention to incorporate the teaching of Kim in the despreader of Ling by generating the despread sample signal (122) by averaging over a predetermined code period for the purpose of providing proper channel parameter evaluation values, as taught by Kim (note col.3, lines 64-67). As a result, the values of 122 received by the summation circuit (126 and 128) would further evaluate based on the despread

sample signal. Although Kim does not explicitly teach that the generating the despread sample signal is performed by a sampling means, one skilled in the art at the time the invention was made would recognize that the element 201 in Fig.2 performs equivalent function of generating a despread sample signal (signals of 209,210) by averaging over a predetermined code period (averaging for Np chip periods, note col.3, line 64 – col.4, line 10). Therefore, it would have been obvious to one skilled in the art at the time of the invention to recognize that the element 201 in Fig.2 provides a sample per every Np chip period performing the function of sampling.

Regarding claim 12, Kim teaches the despreader, which removes the spreading code by multiplying the received signal with the PN (signal spreaded by PN received by 201 in Fig.2).

Regarding claim 17, Ling further teaches wherein said interference estimation apparatus is an SIR estimator (note col.17, lines 20-31) used for performing power control in a spread spectrum transceiver (note col.5, lines 27-32).

Regarding claim 18, Narvinger further teaches wherein said spread spectrum system is a WCDMA system (note col.1, line 30).

Regarding claim 19, the claim is rejected as applied to claim 10 with similar scope. And further, Ling further teaches wherein said interference estimation apparatus is an SIR estimator (note col.17, lines 20-31) used for performing power control in a spread spectrum transceiver (note col.5, lines 27-32).

Regarding claim 20, Narvinger further teaches wherein said spread spectrum system is a WCDMA system (note col.1, line 30).

Regarding claim 21, Narvinger further teaches wherein said spread spectrum system is a WCDMA system (note col.1, line 30).

Regarding claim 30, Narvinger further teaches wherein said spread spectrum system is a WCDMA system (note col.1, line 30).

Regarding claim 32, Narvinger further teaches wherein said spread spectrum system is a WCDMA system (note col.1, line 30).

Regarding claim 37, the claim is rejected as applied to claim 12 with similar scope.

Regarding claim 38, the claim is rejected as applied to claim 10 with similar scope. The further limitation has been previously explained in claim 10.

Regarding claim 39, the claim is rejected as applied to claim 10 with similar scope. The further limitation has been previously explained in claim 10.

Regarding claim 43, the claim is rejected as applied to claim 17 with similar scope.

Regarding claim 44, the claim is rejected as applied to claim 17 with similar scope.

Regarding claim 49, Narvinger further teaches wherein said spread spectrum system is a WCDMA system (note col.1, line 30).

Regarding claim 50, Narvinger further teaches wherein said spread spectrum system is a WCDMA system (note col.1, line 30).

Regarding claim 55, Narvinger further teaches wherein said spread spectrum system is a WCDMA system (note col.1, line 30).

3. Claims 3,11 and 31 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ling et al., USP 6,377,607 B1 (Ling, cited previously) in view of Mueller et al. US 5,379,324 (Mueller) and Kim et al. US 6,067,333 (Kim) and in further view of Narvinger et al, USP 6,381,229 B1 (Narvinger, cited previously) and Blanc et al. USP 6,661,777 B1 (Blanc, cited previously).

Regarding claim 3, Ling in view of Narvinger teach all subject matter claimed, as applied to claim 1 or 10. Although Narvinger teaches signals having different spreading factors, Ling in view of Narvinger do not explicitly teach wherein said

predetermined code period corresponds to the length of the shortest spreading code of said plurality of spreading codes.

Blanc teaches a spread spectrum system wherein minimum spreading factor is related to a maximum transmission rate (note col.8, lines 54-55). Therefore, it would have been obvious to one skilled in the art at the time of the invention to assign said predetermined code period corresponds to the length of the shortest spreading code of said plurality of spreading codes for the purpose of implementing the maximum transmission rate, as taught by Blanc.

Regarding claim 11, the claim is rejected as applied to claim 3 with similar scope.

Regarding claim 31, Narvinger further teaches wherein said spread spectrum system is a WCDMA system (note col.1, line 30).

4. Claims 5,22 and 33 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ling et al., USP 6,377,607 B1 (Ling, cited previously) in view of Mueller et al. US 5,379,324 (Mueller) and Kim et al. US 6,067,333 (Kim) and in further view of Narvinger et al, USP 6,381,229 B1 (Narvinger, cited previously) and Applicants' Admitted Prior Art (AAPA).

   Regarding claim 22, prior art above teaches all subject matter claimed, as applied to claim 1, however, do not explicitly teach wherein said variance

estimate is a minimum variance unbiased (MVU) calculated by in accordance with a relationship: $\delta^2 = E(|X|^2) - |E(X)|^2$.

AAPA teaches this limitation and cites "fundamentals of statistical signal processing: estimation theory, Prentice Hall, 1993 by S.Kay" (note p.12, lines 19-24 of the specification), wherein AAPA admits to be a prior art. Therefore, it would have been obvious to one skilled in the art at the time the invention was made to incorporate the teaching of AAPA in the system of Ling by estimating the noise or interference using the MVU for the purpose of properly estimating the noise or interference even when the probability density function is not known, the signal average providing the best linear unbiased estimate, as taught by Zvonar (note col.2, line 19-25).

Regarding claim 5, the claim is rejected as applied to claim 22 with similar scope. The further limitation of the despread sample signal generated based on the relationship with the equation is taught by Kim teaching a CDMA system of receiving a spread spectrum signal (signal spreaded by PN received by 201 in Fig.2) and generating a despread sample signal (signals of 209,210) by averaging over a predetermined code period (averaging for Np chip periods, note col.3, line 64 – col.4, line 10). Both Ling and Kim teach a CDMA system receiving spread spectrum signals and generating a despread sample signal wherein Kim further teaches that averaging over the predetermined code period provides proper channel parameter evaluation values (note col.3, lines 64-67), hence

provides proper values for further evaluation of the signals. Therefore, it would have been obvious to one skilled in the art at the time of the invention to incorporate the teaching of Kim in the despreader of Ling by generating the despread sample signal (122) by averaging over a predetermined code period for the purpose of providing proper channel parameter evaluation values, as taught by Kim (note col.3, lines 64-67). As a result, the values of 122 received by the summation circuit (126 and 128) would further evaluate based on the despread sample signal.

Regarding claim 33, Narvinger further teaches wherein said spread spectrum system is a WCDMA system (note col.1, line 30).

5. Claim 23 is rejected under 35 U.S.C. 103(a) as being unpatentable over Ling et al., USP 6,377,607 B1 (Ling, cited previously) in view of Mueller et al. US 5,379,324 (Mueller) and Kim et al. US 6,067,333 (Kim) and in further view of Narvinger et al, USP 6,381,229 B1 (Narvinger, cited previously).and Blanc et al. USP 6,661,777 B1 (Blanc, cited previously) and Applicants' Admitted Prior Art (AAPA)..

Regarding claim 23, prior art above teaches all subject matter claimed, as applied to claim 1, however, do not explicitly teach wherein said variance estimate is a minimum variance unbiased (MVU) calculated by in accordance with a relationship: $\delta^2 = E(|X|^2) - |E(X)|^2$.

AAPA teaches this limitation and cites "fundamentals of statistical signal processing: estimation theory, Prentice Hall, 1993 by S.Kay" (note p.12, lines 19-24 of the specification), wherein AAPA admits to be a prior art. Therefore, it would have been obvious to one skilled in the art at the time the invention was made to incorporate the teaching of AAPA in the system of Ling by estimating the noise or interference using the MVU for the purpose of properly estimating the noise or interference even when the probability density function is not known, the signal average providing the best linear unbiased estimate, as taught by Zvonar (note col.2, line 19-25).

Allowable Subject Matter

6. Claims 6-8,26,28,29 and 34-36 are allowed.
7. Claims 14-16,24,25,27,40,41,46-48 and 52-54 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.
8. The following is a statement of reasons for the indication of allowable subject matter: present application discloses a spread spectrum system determining variance of a received signal. Prior art teaches all subject matter claimed, however, does not explicitly teach wherein the expectation value is obtained as recited in the claim of c/m, and the equation recited to determine the interference estimate. And further, prior art does not explicitly teach averaging the output of the subtracting means over the predetermined symbols of the received signal.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Sam Ahn whose telephone number is (571) 272-3044. The examiner can normally be reached on Monday-Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mohammad Ghayour can be reached on (571) 272-3021. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Sam K. Ahn
Patent Examiner

10/13/06